

College Planning Partnerships

For The
Redesigned
SAT

The SAT Crash Manual

Created by the tutors at College Planning Partnerships

Includes 2 Reading & 2 Writing and Language Tests

Includes 65 new math problems from the most important disciplines



1

If $3x - 4$ is equal to 16, what is the value of $6x$?

- A) $\frac{20}{3}$
- B) 20
- C) 24
- D) 40



2

If $\frac{4}{5}t = \frac{3}{2}$, what is the value of t ?

- A) $\frac{8}{15}$
- B) $\frac{5}{6}$
- C) $\frac{6}{5}$
- D) $\frac{15}{8}$

3

If $\frac{1}{2}x + \frac{2}{3}x + \frac{3}{4}x = 46$, what is the value of x ?



4

Let $7x + x + x + 2x + 12 = 2x + 390$. What is the value of x ?

5

If $\frac{5}{(6x+3)} = \frac{15}{p}$, what is p in terms of x ?

- A) $2x + 1$
- B) $2x + 3$
- C) $18x + 3$
- D) $18x + 9$



6

If $2y(2x + 1) = 12$, which of the following represents y in terms of x ?

- A) $\frac{6}{2x+1}$
- B) $\frac{24}{2x+1}$
- C) $12x + 6$
- D) $24x + 12$

7

$$13x - k = 2kx$$

Which of the following expressions correctly expresses k in terms of x ?

- A) $\frac{13}{x-1}$
- B) $\frac{13x}{2}$
- C) $\frac{13x}{2x+1}$
- D) $\frac{13x-1}{x}$



8

The number of tickets available for a performance of *Guys and Dolls* can be modeled by $a = 1300 - 26d$, where a represents the number of tickets still available d days after the tickets go on sale. What is the meaning of 26 in this equation?

- A) The number of tickets that are made available for sale each day
- B) The number of tickets that are sold each day
- C) The number of days required to sell all of the tickets
- D) The number of tickets sold after 26 days

9

On January 1, a pet shelter has 27 pets. During the following year, an average of 9 pets per month were adopted and an average of 18 pets per month were newly sheltered. Which of the following equations best models the number of pets living in the shelter, p , in terms of the number of months, t , since Jan. 1?

- A) $p = -9t + 27$
- B) $p = -2t + 27$
- C) $p = 2t + 27$
- D) $p = 9t + 27$



10

$$g = 20 - \frac{m}{28}$$

If Martha begins with a full tank of gas, the number of gallons, g , left in the tank after she drives m miles is given by the equation above. When full, how many gallons of gas does Martha's tank hold?

- A) 8
- B) 20
- C) 28
- D) 560

11

One of the requirements for becoming a court reporter is the ability to type 225 words per minute. Donald has been training to become a court reporter. The number of words per minute that Donald could type after training for x weeks, W , can be modeled by the equation $W = \frac{(5x + 350)}{2}$. According to the model, for every additional 1 week of training, by how many words per minute will Donald's typing speed increase?

- A) 2.5
- B) 3.5
- C) 4.0
- D) 5.0



12

The total annual book sales in the United States can be modeled by the equation $b = 19.8 + 1.2y$, where b is the total dollar amount of book sales, in billions, and y is the number of years since 2000. According to the model, which of the following statements about book sales in the United States is true?

- A) In 2000, book sales in the United States totaled \$1.2 billion.
- B) In 2001, book sales in the United States were \$1.2 billion less than they were in 2000.
- C) In 2003, book sales in the United States were \$1.2 billion less than they were in 2004.
- D) Every 1.2 years, \$1 billion in books are sold in the U.S.



13

$$0.9x + y = 8.1$$

The city of Boston was recently hit by a major snowstorm. The equation above can be used to model the depth of the snow, y , in inches, that still covers the ground x days after the storm began. What does it mean that $(9,0)$ is a solution to this equation?

- A) During the days immediately following the snowfall, 9 inches of snow melt each day.
- B) It takes 9 days for 8.1 inches of snow to fall.
- C) When snow began to melt, 9 inches of snow covered the ground.
- D) It will take 9 days for the ground to be completely clear of snow.



14

The function d , defined by $d(t) = at + b$, where a and b are constants, models the distance, in meters, of a marathon runner after t minutes of running during a time period in which her pace is approximately constant. What does a represent?

- A) The predicted number of meters the runner travels during each minute during the period.
- B) The predicted distance run, in meters, between the start and the end of the period.
- C) The predicted total distance that she has run, in meters, at the end of the period.
- D) The number of minutes that the runner's pace is approximately constant.

15

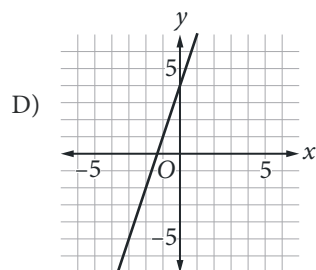
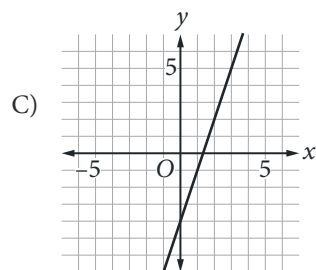
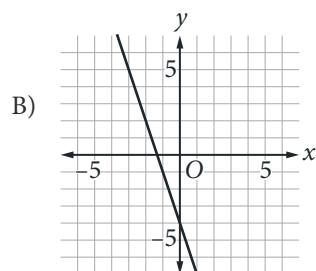
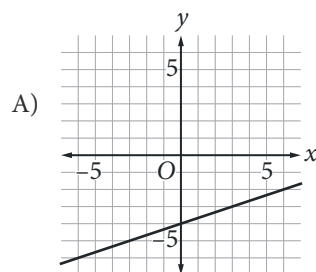
What is the slope of the line in the xy -plane that passes through the points $(-\frac{9}{2}, 7)$ and $(-\frac{1}{2}, 2)$?

- A) $-\frac{5}{4}$
- B) -1
- C) 1
- D) $\frac{4}{5}$



16

Which of the following is the graph of the equation $y = 3x - 4$ in the xy -plane?



17

In the xy -plane, line k passes through $(0, -10)$, $(4, -8)$, and $(100, p)$. What is the value of p ?

18

x	$f(x)$
0	b
1	$c + 2$
2	$2c$
3	$3c - 2$

For the linear function f , the table above gives some values of x and their corresponding values of $f(x)$, where b and c are constants. Which of the following is equal to b ?

- A) 0
- B) 2
- C) 4
- D) 6

19

In 2005, the price of a metric ton of cocoa beans was \$1,448. In 2015, the price of a metric ton of cocoa beans was \$3,318. If the price of a metric ton of cocoa beans increased linearly over this 10-year period, what was the price of a metric ton of cocoa beans in 2013?

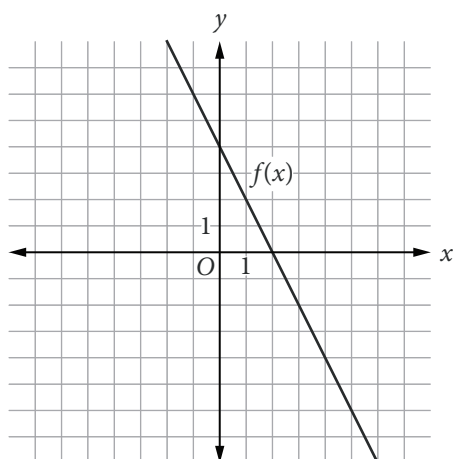


20

x	$f(x)$
0	-5
3	7
8	z

Some values of the linear function f are given in the table above. What is the value of z ?

21



The graph of the linear function f is shown in the xy -plane above. The graph of the linear function g is perpendicular to the graph of f . If the graph of g passes through the point $(0, -6)$, what is the value of $g(16)$?

- A) -2
- B) 2
- C) 8
- D) 26



22

$$y = 4x$$

$$5y - 4x = 8$$

Which of the following ordered pairs (x, y) satisfies the system of equations above?

- A) $(\frac{1}{2}, 2)$
- B) $(1, 2)$
- C) $(1, 4)$
- D) $(\frac{3}{2}, 6)$

23

$$4x - y = 18$$

$$x + 3y = -2$$

Which ordered pair (x, y) satisfies the system of equations shown above?

- A) $(-2, 2)$
- B) $(2, -2)$
- C) $(4, -2)$
- D) $(5, 2)$



24

At Gordon's Pizza, small pizzas are cut into 12 slices and large pizzas are cut into 16 slices. On Tuesday, Gordon's sells 47 pizzas that total 604 slices. Which of the following systems of equations could be used to determine the number of pizzas of each size that Gordon's sold on Tuesday, where s represents small pizzas and ℓ represents large pizzas?

- A) $12s + 16\ell = 604$
 $s + \ell = 47$
- B) $12s + 16\ell = 47$
 $s + \ell = 604$
- C) $12s + 16\ell = 604$
 $s\ell = 47$
- D) $12s + 16\ell = 47$
 $s\ell = 604$

25

$$5x + 3y = 34$$

$$x + 10y = 35$$

If the x - and y -coordinates of a point in the xy -plane satisfy the system of equations above, what is the value of $12x + 26y$?



26

$$0.5a(8x + 4) = 10x + 5$$

In the equation above, a is a constant. For what value of a does the equation have infinitely many solutions?

27

In Ancient Egypt, long distances were typically measured in *stadia*. The length of one stadion is related to modern day measurements in the measurement table below.

1 stadion	=	157.5 m
1 km	=	1000 m
1 mi	=	1.609 km

The driving distance between Portland, OR and San Francisco, CA is approximately 635.9 mi. Approximately how long, in stadia, is this distance?

- A) 160
- B) 2300
- C) 6500
- D) 62000

28

A production plant owned by a company that produces energy drinks has the ability to fill 250 milliliter cans from a 3,000-liter tank. What is the maximum number of 250 milliliter cans that can be filled from this tank? (1 liter = 1,000 milliliters)

- A) 120,000
- B) 12,000
- C) 1,200
- D) 12

29

A solution contains 6 grams of glucose per 100 milliliters. Each mole of glucose weighs 180 grams. How many moles are there in 600 milliliters of the glucose solution?

30

New York City requires that motorists pay a toll of \$8.50 to cross over the RFK Bridge. If the mayor of New York proposes a 12% toll increase, what would be the new cost of crossing over the bridge under this proposal?

- A) \$1.02
- B) \$9.20
- C) \$9.52
- D) \$9.86

31

A citrus farm grows only oranges and lemons. Last year, this farm produced 1,300 kilograms of oranges and 700 kilograms of lemons. Due to a drought, the production, by weight, of oranges will decline by 30 percent and the production, by weight, of lemons will decline by 10 percent. By what percent will the overall yield of the farm decline?

- A) 20%
- B) 21%
- C) 22%
- D) 23%

32

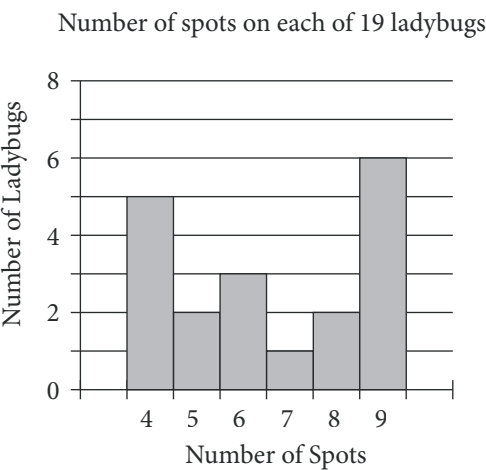
In 2015, the population of City X was 20% more than it was in 2010. If the population of City X was 300,000 in 2015, what was the population of City X in 2010?

- A) 240,000
- B) 250,000
- C) 280,000
- D) 360,000

33

Chandler's Megamarket is holding a "buy two, get one free" sale on packs of Arctic Seltzer. If Stacy leaves the market with 21 packs of seltzer, how many will she have paid for?

Questions 34–35 refer to the following information.



Nineteen ladybugs are selected at random from a population of 266. The number of spots on each of the nineteen ladybugs is given in the histogram above.

34

Based on this data, how many ladybugs in the population have at least 7 spots?

35

What is the median number of spots of the 19 ladybugs represented in the histogram above?

- A) 4
- B) 5
- C) 6
- D) 7

36

Alex is preparing for the SAT exam. His goal is to study an average of at least 10 hours per week for 5 weeks. He studied 7 hours the first week, 9 hours the second week, 12 hours the third week, and 11 hours the fourth week. Which inequality can be used to represent the number of hours, x , Alex could study on the fifth week to meet his goal?

- A) $\frac{7 + 9 + 12 + 11}{4} + x \geq 10$
- B) $7 + 9 + 12 + 11 \geq 10x$
- C) $\frac{7}{5} + \frac{9}{5} + \frac{12}{5} + \frac{11}{5} + x \geq 10$
- D) $7 + 9 + 12 + 11 + x \geq 5(10)$

37

Two high school football coaches tracked the time it took each of their players to complete a 40-yard dash. The results are shown in the table below.

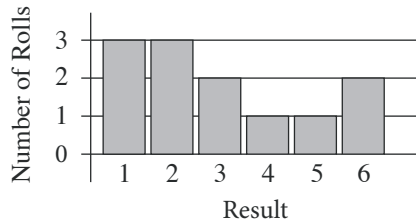
	Palm Valley	Edgewater
4.4 or less	1	0
4.5–4.9	11	8
5.0–5.4	16	14
5.5–5.9	12	9
6.0–6.4	10	6
6.5+	8	5

Which of the following could be the median 40-yard dash time for the 58 students on the Palm Valley team?

- A) 5.0 sec
- B) 5.3 sec
- C) 5.6 sec
- D) 6.1 sec

38

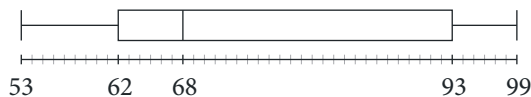
Results of Twelve Dice Rolls



Twelve six-sided dice are rolled at random. The graph above shows the frequency distribution of the results. What is the mean of those dice rolls?

- A) 2.5
- B) 3.0
- C) 3.25
- D) 3.5

39

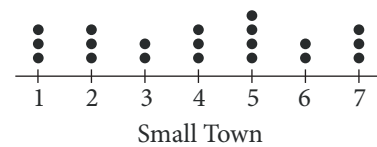


Which of the following statements about the data represented in the box plot above must be true?

- I. There are more data between 68 and 93 than between 62 and 68.
 - II. There are no data between 53 and 62.
 - III. The median of the data is 68.
- A) None of these
 - B) I and II only
 - C) I and III only
 - D) III only

40

Distances from School of 20 Randomly Selected Students



Researchers randomly selected twenty students who ride the bus to school from two different high schools: one in an major city and one in a small town. The dot plots above represent the distances, in miles, each student lives from the school, rounded to the nearest mile. Which of the following statements are true about these data?

- I. The mean distance from school of students in the major city is greater than the mean distance from school of students in the small town.
 - II. The median distance from school of students in the major city is greater than the median distance from school of students in the small town.
 - III. The standard deviation of the distances from school of students in the major city is greater than the standard deviation of the distances from school of students in the small town.
- A) None of the statements
 - B) I only
 - C) II only
 - D) III only

41

A city council plans to conduct a survey to determine which of four locations will be most suitable to build a new stadium. Of the following sampling methods, which is most likely to yield results that represent the preferences of all city residents?

- A) Conducting a survey of 1,000 patrons at a local sports bar
- B) Conducting a phone survey of residents who live near each proposed location until 1,000 responses are received
- C) Conducting a mail survey of 1,000 households randomly selected from within the city limits
- D) Conducting an online survey on a local television station's website

42

Two separate polling companies each released the results of a survey of support for a specific proposition in the town of Lisbon. Both Company A and Company B randomly surveyed adults in Lisbon and each found that 72% of its respondents were in favor of the proposition, however, Company A's survey reported a margin of error of 3.7% while Company B's survey reported a margin of error of 2.1%. Which of the following reasons could explain why the margin of error for Company A's survey was greater than the margin of error for Company B's survey?

- A) Company A's survey had a higher rate of responses that were not recorded than Company B's survey.
- B) Company A's survey asked a different population than Company B's survey.
- C) Company A's survey had a larger sample size than Company B's survey.
- D) Company A's survey had a smaller sample size than Company B's survey.

43

$$x^3 - 4x + 7$$

$$-2x^3 - x + 5$$

Which of the following is the sum of the two polynomials above?

- A) $-x^3 - 5x + 12$
- B) $x^3 + 5x + 12$
- C) $-2x^6 + 4x^2 + 12$
- D) $2x^6 - 4x^2 + 12$

44

If $y = x^3 + 2x + 3$ and $z = x^2 + x - 5$, what is $y - 2z$ in terms of x ?

- A) $-x^3 + 1$
- B) $-x^3 + 13$
- C) $x^3 - 2x^2 + 1$
- D) $x^3 - 2x^2 + 13$



45

Which of the following is equivalent to the expression $x^2 + 3x - 18$?

- A) $(x - 9)(x + 2)$
- B) $(x - 6)(x - 3)$
- C) $(x - 3)(x + 6)$
- D) $(x - 2)(x + 9)$

46

Which of the following is equivalent to $x^3 - 9x$?

- A) $x(x^2 - 9x)$
- B) $x(x - 3)(x + 3)$
- C) $x(x - 3)^2$
- D) $x^2(x - 9)$

47

Which of the following is equivalent to $2x^3 + 8x^2 + 3x + 12$?

- A) $2x(x + 8)(x + 3)$
- B) $(x^2 + 4)(2x + 3)$
- C) $2(x^2 + 2)(x + 3)$
- D) $(2x^2 + 3)(x + 4)$

48

$$5x(x + 7) - 4(x + 7) = 0$$

For what positive value of x is the equation above true?

- A) $\frac{5}{7}$
- B) $\frac{4}{5}$
- C) $\frac{5}{4}$
- D) $\frac{7}{5}$



49

What are the solutions to the equation $3x^2 - 75 = 0$?

- A) $-\sqrt{75}$ and $\sqrt{75}$
- B) $-\frac{\sqrt{75}}{3}$ and $\frac{\sqrt{75}}{3}$
- C) -25 and 25
- D) -5 and 5

50

Max tosses a coin off a bridge into a stream below. The distance, h , in feet, the coin is above the water is modeled by the equation $h = -16t^2 + 64t + 80$, where t is the number of seconds that have elapsed since Max threw the coin. After how many seconds will the coin hit the water?

- A) 1
- B) 3
- C) 4
- D) 5

51

What are the solutions to $4x^2 + 8x + 2 = 0$?

- A) $-8 \pm 4\sqrt{2}$
- B) $-8 \pm 4\sqrt{6}$
- C) $-1 \pm \frac{\sqrt{2}}{2}$
- D) $-1 \pm \frac{\sqrt{6}}{2}$

52

$$x = 2y + 4$$

$$0 = (2x - 2)(x - 9)$$

In the system of equations given above, what is the sum of the two possible values of y ?

- A) -1
- B) $\frac{7}{2}$
- C) $\frac{13}{2}$
- D) 1



53

Which of the following is equivalent to $\frac{3x^2 + 5x + 9}{x + 2}$?

- A) $3x + 2$
- B) $3x + \frac{11}{x+2}$
- C) $3x - 1 + \frac{7}{x+2}$
- D) $3x - 1 + \frac{11}{x+2}$



54

$$4x^2 + 40x + 100 = a(x + b)^2$$

In the equation above, a and b are constants. If the equation has infinitely many real solutions, what is the value of $a + b$?

55

The cubic function $f(x)$ is defined by $2x^3 + ax^2 + bx + c$, where a , b , and c are constants. In the xy -plane, the graph of f passes through the points $(2, 0)$, $(-\frac{1}{2}, 0)$, and $(p, 0)$. Which of the following could be the correct factorization of this polynomial?

- A) $f(x) = (x - 2)(2x + 1)(x - p)$
- B) $f(x) = (x - 2)(2x + 1)(x + p)$
- C) $f(x) = (x + 2)(2x - 1)(x - p)$
- D) $f(x) = (x + 2)(2x - 1)(x + p)$



56

x	$f(x)$
-1	-1
0	3
2	0
4	1

The function f is defined by a polynomial. Some values of $f(x)$ are given in the table above. Which of the following must be a factor of $f(x)$?

- A) $x - 2$
- B) $x - 1$
- C) $x + 1$
- D) $x + 4$



57

What is the x -coordinate of the vertex of the parabola defined by $y = (x - 5)(x + 1)$?

- A) -3
- B) -2
- C) 2
- D) 3



58

What is the y -coordinate of the vertex of the parabola defined by $y = x^2 - 6x + 50$?

- A) 14
- B) 41
- C) 47
- D) 59



59

A 2015 college graduate is offered a job as an ecologist that will pay \$36,000 during the first year and a 5% raise from the previous year's salary in each subsequent year. Which of these calculations correctly determines what his salary will be after the third such yearly raise?

- A) $36,000(0.15)$
- B) $36,000(1.15)$
- C) $36,000(1.05)^3$
- D) $36,000(3)^{1.05}$

Questions 60–61 refer to the following information.

Erin must memorize *The Raven* by Edgar Allen Poe for her literature class. On the day she must recite it, she has memorized all of the lines, but t days later, the number of lines she can recall is modeled by the function

$$R(t) = 108(.93)^{\frac{t}{4}}.$$



60

How many lines does *The Raven* contain?

61

Which of the following is a true statement about the relationship between the number of days since Erin has recited *The Raven* and the number of lines she can recall?

- A) One-fourth of a day from today, Erin will remember about 7% fewer lines than she remembers now.
- B) One-fourth of a day from today, Erin will remember about 93% fewer lines than she remembers now.
- C) Four days from today, Erin will remember about 7% fewer lines than she remembers now.
- D) Four days from today, Erin will remember about 93% fewer lines than she remembers now.

62

Year	0	1	2	3
Salary	31,250	32,500	x	y

The table above shows the yearly salary, in dollars, of an employee at a company. Assume that the employee's salary grows exponentially. What is the value of y ?

- A) \$35,000
- B) \$35,076
- C) \$35,152
- D) \$35,304



63

In the function f defined by $f(x) = a \cdot b^x$, what does a represent?

- A) The minimum value of f .
- B) The y -intercept of the graph of f in the xy -plane.
- C) The percentage change in f when x increases by 1.
- D) The value of f when x equals 1.

64

$$p(x) = 6^x - 6$$

The function p is defined by the equation above. Which of the following points lies on the graph of $y = p(x)$?

- A) $(0, -5)$
- B) $(0, -1)$
- C) $(0, 0)$
- D) $(0, 6)$

65

A statistician modeled tuition at Springfield University in two ways. According to both models, tuition in 2014 was \$24,000. In one model, tuition increased 5% per year. In the other model, tuition increased k dollars per year. Both models predicted the same tuition in 2017. What is the value of k ?

Mathematics Answer Key

Problem Number	Correct Answer	Problem Number	Correct Answer	Problem Number	Correct Answer
1	D	25	138	49	D
2	D	26	$5/2$ or 2.5	50	D
3	24	27	C	51	C
4	42	28	B	52	D
5	D	29	0.2	53	D
6	A	30	C	54	9
7	C	31	D	55	A
8	B	32	B	56	A
9	D	33	14	57	C
10	B	34	126	58	B
11	A	35	C	59	C
12	C	36	D	60	108
13	D	37	C	61	C
14	A	38	B	62	C
15	A	39	D	63	B
16	C	40	A	64	A
17	40	41	C	65	1261
18	C	42	D		
19	2944	43	A		
20	27	44	D		
21	B	45	C		
22	A	46	B		
23	C	47	D		
24	A	48	B		

